

The Measurement of Money
Supply

Outline

Preface

1. What is Money?
 History of Jamaican Money
2. Functions of Money
 Medium of Exchange
 Unit of Account
 Store of Value
 Features of Money
3. Money Supply
 Standard Measurements of Money Supply
 Country Variations
 Bank of Jamaica
 Federal Reserve System
 Bank of England
 Reserve Bank of New Zealand
4. Summary

GLOSSARY OF TERMS

PREFACE

In modern societies, money plays a significant role in almost everything. Nonetheless, when there is too much money around, it can do more harm than good for an economy. Some economists argue that if the money supply is growing faster than the rate at which output and income are growing, then this will result in an increase in prices, which will lead to a fall in people's standard of living. For that reason, it is important that the authorities place special emphasis on the control of money supply. In order to control the money supply, the monetary authorities must measure the amount of money within the country at regular intervals.

*This pamphlet provides an explanation of the procedure involved in determining the amount of money within an economy at a point in time. Section one provides a definition of money and an overview of the history of the present monetary system. The functions and features of money are addressed in section two. In section three, the components of money supply from a theoretical and an empirical perspective will be examined. Included in this section is a presentation of the Bank of Jamaica's (BOJ's) monetary aggregates, which should provide a better appreciation of the money supply data recorded in BOJ's statistical publications. Additionally, there are examples of the definitions employed by a number of other central banks to measure their money supply. The final section provides a brief summary and a glossary of terms that are typewritten in **bold italics** for easy reference.*

THE MEASUREMENT OF MONEY SUPPLY

1. What is Money?

Money can be defined as any medium which facilitates the exchange of goods and services between people. Exchange has taken on different forms throughout history, starting with the barter system in the earliest centuries, where commodities were directly exchanged for each other. During the barter era, people would trade the things they had, for the things they needed, for example pigs for fabric. Barter suffered from the major shortcoming of dependence on a “double coincidence of wants (the pig farmer needing fabric finding a weaver needing pigs and in roughly the same quantities for exchange). Generally desired commodities therefore came to serve as intervening means of exchange. (If oxen are generally accepted, then the pig farmer can exchange pigs for oxen and use oxen to purchase textiles).

By social preference, different countries adopted the use of individual items as a standard for the exchange of goods and services. Convenience required that such commodities should have the characteristics of durability (unlike rock salt) divisibility (unlike live oxen) and relative scarcity (unlike leaves in a tropical rainforest). In this context, precious metals standardized by weight and then coinage came to be used as currency.

Metal coins were used by the Chinese as early as 400 B.C. These were made of bronze, gold and silver. Throughout the 15th century, in the New World, there were other forms of primitive money, such as copper and cacao beans used by the Aztecs. As late as the 19th century, standard items such as cowrie shells and gold nuggets were used in Ghana and India and iron kisi pennies in West Africa. Other forms of commodity money, included tally sticks, ivory and whale’s teeth.

By the end of the 19th century, there was widespread use of precious metals, which had replaced primitive commodity monies. These metals were used in the minting of coins, which became the standard form of money. Arising from concerns about the bulkiness and safety of transporting these precious coins, traders normally entrust them to goldsmiths in exchange for a paper receipt. These receipts represented a form of

commodity money as they were fully backed by gold and other metals. At the beginning of the 20th century¹, as the credibility of these receipts gained momentum, they became widely accepted as means of exchange. As time evolved, this form of paper money was replaced by another form called *fiat money*, which remains in use at present. Although fiat paper money has no intrinsic value, they will be accepted as means of payment, as long as people are confident that the government will defend their value. The government protects the value of its currency by limiting the rate of growth of supply to an approximation with the growth of goods and services within the economy. On that account, the monetary authorities have sole responsibility for issuing notes and coins within countries. Without careful monitoring, there may be too much money chasing too few goods, thus placing upward pressure on prices, that is inflation. Excessive inflation undermines business planning and leads to a decline in living conditions.

Another form of paper money introduced in the early 20th century were bank deposits. These deposits were owned by banks and given to depositors in exchange for commodity money, such as precious metals. Like fiat money, the cost of producing these paper notes is relatively small compared with the value of the commodities they represent and production is also restricted. A major advantage of these deposits is that the users have the ability to write cheques of variable denominations. The rapid pace of technological advancements during the latter part of the 20th century has resulted in the widespread use of automated debit and credit cards, which are reducing the role of paper money in many modern societies.

History of Jamaican Money

The earliest settlers in Jamaica, the Tainos or Amerindians, traded in commodities such as beads made of stone and wooden or clay idols, called *zemis*. Another form of commodity money was the gold disc, which was used as a bride price, similar to the African tradition. However, with the arrival of Columbus and other European settlers in the 15th century, European coins were introduced to Jamaica. The first coin to be circulated was the copper coin called *maraveda*. Then in the 17th century, the Spanish

¹ This is often referred to as the era of the gold standard.

silver dollar called *a piece of eight*, began to circulate in Jamaica and remained in popular use, alongside the British silver coin called *anchor money*, which was introduced to the British colonies in 1825. The Spanish currency was abandoned in 1839, when the British money was declared the official currency of the colony.

Jamaican nickel coins, known as *pennies* and *halfpennies* were introduced in 1869, followed by the *farthing* in 1880. The *farthing* was last issued in 1952, but the *pennies* and *halfpennies* remained in circulation until 1969, when they were replaced by the decimal system of currency.

Alongside the issuance of coins were various forms of Jamaican paper monies, also called banknotes. These banknotes were first introduced in the mid-19th century, when the London-based Colonial Bank issued the first private banknotes, followed by other banks, namely the Planters Bank, the Bank of Nova Scotia, the Royal Bank and the Canadian Imperial Bank of Commerce. These were followed by the Government of Jamaica (GOJ) banknotes issued in denominations of *5-shilling* and *10-shilling* in 1920. Then in 1940, the Board of Commissioners of Currency declared the GOJ, the sole issuer of banknotes on the island, after which came the issuance of the *1-pound* and *5-pound* notes in 1942. These were replaced by Bank of Jamaica notes in 1961, issued in denominations of *5-shilling*, *10-shilling*, *1-pound* and *5-pound*. As with the Jamaican coins, the use of sterling denominated banknotes was discontinued in 1969, following the launch of the current decimal system, which uses Jamaican dollars and cents.

2. Functions of Money

The textbook definition states that money satisfies three basic functions. These are as follows:

- a) It acts as a medium of exchange
- b) It acts as a unit of account and
- c) It acts as a store of value.

Medium of Exchange

As a medium of exchange, the item must be readily accepted as payment for goods purchased or services rendered. Recalling the example of the barter system, money therefore solves the problem of double coincidence of wants. As such, money frees up resources to be used in their most productive capacity. In addition, without money, exchange is limited to only two parties, while money allows for trade among many groups. Thus it can be said to smooth the flow of goods and services within and among countries. Money has therefore been purported to be one of the greatest socially evolved phenomena.

Unit of Account

Defining money as a unit of account means that the value of assets and commodities is given in terms of money. In this case, it provides a reference for the pricing of commodities and therefore a more efficient exchange system. Money also provides a standard on which to measure the level of profitability of business ventures. As a unit of account, money can be compared with other standards such as the metric system, which is used to measure weights and distance. To illustrate the importance of this function, let us examine a barter economy. Assuming that only three commodities are traded, fish, rice and soap, then each commodity has two prices, for example, the price of fish in terms of rice and the price of fish in terms of soap. In that case, each person in the society would have to remember at least three prices. By extension, if ten commodities are traded then each person must remember at least forty-five prices². Imagine the confusion involved in

² Formula for calculating the number of prices under a barter system is as follows. $\{N(N-1)\}/2$, where N represents the number of commodities being traded.

shopping in this environment where individuals are faced with such a range of prices. In a monetary system however, each item has a unique price, in which case the number of prices quoted is equal to the number of commodities traded.

Store of value

As a store of value, money allows individuals to save a portion of their present income for consumption in the future. In other words money represents a store of wealth from one time period to another. There are also other assets, such as property and jewelry, that function as a store of value. These other assets may have the advantage of increasing in value over time, while money in the form of notes and coins usually pays no interest and in times of rapid price increases, it loses value. Notwithstanding, money has the advantage of being readily accepted as a means of payment. This implies that money is a very liquid asset. Therefore, the use of money eliminates the cost of converting these other assets into a form which is generally accepted in the exchange of goods and services.

Features of Money

For an object to serve efficiently as money, it should possess the following features:

- 1) It must be widely accepted as a means of payment.
- 2) It must be divisible, that is, it must exist in different denominations, for example \$1, \$5, \$10 and \$500.
- 3) It must be easily identified.
- 4) It must not be easily duplicated or counterfeited (i.e. it must be relatively scarce).
- 5) It must be easily transported.
- 6) It must be durable, allowing it to last for very long periods.

Bank deposits, which are easily transferable, meet these criteria even more efficiently in modern economies. Deposits have consequently become the largest component of ***money supply***.

3. Money Supply

This section examines the more frequently used measures of money supply. Money supply is the total stock of assets that are generally acceptable as media of exchange within an economy at a particular time. A number of items may qualify as media of exchange. The decision as to what items are to be included in the money supply remains an issue in economic debates. There is no universally applicable empirical definition of money supply and the choice may vary dependent on what issue is being examined. There are varying degrees of *liquidity* or ‘moneyness’, depending on how easily an asset can be converted into other assets. With the most *liquid assets* being notes and coins established as medium of exchange by legal fiat, “moneyness” of other assets depends on how easily they may be converted to notes and coins. Furthermore, as the degree of liquidity falls, the distinction between monetary assets and other *financial assets* becomes increasingly blurred. Therefore, in this context, the International Monetary Fund (IMF) has sought to outline standards for the measurement of the amount of money in an economy.

Standard measurements of Money Supply

According to the IMF’s manual, money supply is measured as the combined deposit liabilities of the *banking system* and the currency liabilities of the central bank, both held by households, firms, nonprofit institutions and all public sector entities outside of the central government. In this official or standard representation of money supply, there are three monetary aggregates delineated; **M0**, **M1** and **M2**.

M0 includes only currency in the hands of the public, banks’ statutory reserve deposits held at the central bank and banks’ cash reserves. This aggregate represents the monetary liabilities of the central bank and is usually referred to as the monetary base or reserve money.

The second aggregate **M1**, comprises currency held outside the banking system and the current account deposit liabilities of commercial banks held for transactive purposes.³ It may also include some foreign currency deposits that are used for domestic transactions. This definition implies that only assets that are directly used in making payments should be considered as money. It should be noted that although most current account deposits do not attract interest, they provide a convenient and safe alternative to cash as a means of payment.

The **M2** aggregation of money supply seeks to broaden the range of liquid assets to include some interest earning items, such as savings deposits and *fixed* or *time deposits*. This broad monetary aggregate, **M2**, comprises **M1** plus short-term (usually a year and under) savings and time deposits, certificates of deposit, foreign currency transferable deposits and *repurchase agreements*. Although some of these assets are not readily accepted as payment for goods and services, the transaction cost associated with their conversion is relatively small. For example, with the introduction of automated banking machines, holders of savings accounts no longer have to go directly to the bank to make withdrawals thus the burden of converting savings balances to cash is minimised. As such, savings accounts are now used in a similar manner as current accounts in many societies, thereby enhancing depositors' capacity and convenience in undertaking expenditure. With respect to time deposits, since these deposits can be withdrawn on short notice, they also provide some degree of liquidity to depositors. It should also be noted that there is an interest penalty associated with the pre-mature closure of these accounts. However, as long as the benefit of breaking these arrangements outweighs the cost, they do represent an alternative to cash and current accounts.

In some countries, broad aggregation of money has been extended beyond M2 to include some less liquid financial assets. These aggregates add to **M2**, long-term foreign-

³ The IMF states that, while some non-bank institutions are involved in the clearing process, for ease of comparison, current account balances held in these institutions are not normally taken into account when measuring narrow money.

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currency time deposits, travellers' cheques, short-term bank notes and money market *mutual funds*. Although these instruments are primarily used to promote long-term savings, they can be easily converted into currency or demand deposits at little cost. As such, they are said to facilitate the exchange of goods and services among individuals.

The primary monetary aggregates outlined above all satisfy the liquidity criteria. While some assets could not be directly employed as payment for goods and services, the conversion costs were minimal. There are other less liquid financial assets, which satisfy the store of value criterion and their inclusion allows for broader measurements, such as **M3** and **M4**. (See Table 1 below).

Table 1

This table presents an outline of the standard definitions of money supply. It is presented in accordance with the IMF's Manual on Monetary and Financial Statistics. Each monetary aggregate is ranked according to the degree of liquidity it provides.

Table 1***Standard measures of the money supply***

Measure	Definition	Comments
M0	Currency in the hands of the public plus reserves held on behalf of commercial banks.	Often referred to as the monetary base or reserve money. Controlled by the monetary authority/central bank.
M1	Notes and coins outside of the banking system plus current account balances, held for transactions.	Most commonly used definition. Readily accepted for payment of goods and services. Some of these assets may attract a minimal interest payment. May include foreign currency deposits that are directly used for domestic transactions.
M2	M1 plus short-term time and savings deposits, foreign currency transferable deposits, certificates of deposit and repurchase agreements.	Minimal cost of conversion to cash. Close substitutes for current accounts.
M3	M2 plus travellers' cheques, short term bank notes, long term foreign currency time deposits and money market mutual funds.	The components of M3 vary between countries. Emphasis is placed on degree of liquidity or ease of conversion to cash.
M4 or L	M3 plus treasury bills, negotiable bonds and pension funds.	Very broad money, which is usually, considered a measure of fairly liquid assets. Generally includes most of the instruments traded in money markets.

Country Variations

The determination of which items are to be included in the measurement of money supply is related to the level of financial liberalisation, or sophistication in a country. As an economy advances, there evolves an increasing range of monetary and other financial instruments and it becomes increasingly difficult to establish a distinction between them. Therefore periodic revisions have to be made to the compilation of monetary statistics. Recall that a main purpose for measuring the money supply is to facilitate analysis of its growth relative to other macroeconomic targets including inflation and economic growth. For example, if a central bank operating in a highly developed financial market, does not monitor some financial instruments, particularly those which are considered relatively illiquid, it could be surprised by changes in consumer demand and a higher than expected inflation out-turn.

Accordingly, varying measures are used by different central banks to represent money supply. The alternative treatments of certain financial assets, such as *securities*, foreign currency deposits and other less liquid assets will also be addressed. The analysis will focus primarily on the operations at the Bank of Jamaica (BOJ), followed by an outline of the measures employed at the Federal Reserve System (Fed), the Bank of England (BOE) and the Reserve Bank of New Zealand (RBNZ). For this purpose, the standards outlined in the IMF's manual will be used as a point of reference.

The Bank of Jamaica (BOJ)

The BOJ publishes the monetary aggregates in its monthly Statistical Digest. This publication contains data on the Bank's three primary monetary aggregates, namely base money or reserve money, narrow money and broad money, presented as **M0**, **M1** and **M2**. The first chapter of the *Digest*, entitled *Monetary Authorities* allows for the computation of these variables. In addition, the Bank publishes a comparative summary of these aggregates on the first page of its monthly *Economic Statistics*. (See Appendix)

There are two separate figures for **M1** and **M2**, one including foreign currency deposits and the other excluding foreign currency deposits⁵. These aggregates will be referred to as **M1** and **M2** and **M1J** and **M2J** respectively and they are published on *Tables 1* and *1a* entitled *Monetary Survey*. On both tables, **M1/M1J** data is shown in *column 9* entitled *Total*, which represents the combination of currency with the public and demand deposits (adj.). Here demand deposits represents commercial banks' holdings of balances for private institutions and individuals plus bankers' drafts outstanding, minus cash items in the process of collection. To arrive at a value for **M2/M2J**, simply add the values in *columns 9* and *12*. Here **M2/M2J** comprises **M1/M1J** plus time and savings deposits referred to as *quasi money*. (See Table 2 below)

Table 2

End of Period	MONETARY SURVEY 1 /												J\$mn.
	DOMESTIC CREDIT				MONEY SUPPLY				QUASI-MONEY			Other Items (net)	
	Foreign Assets (net)	To Public Sector (net)	To Private Sector	To Other Financial Institutions (net)	Total	Currency with the Public	Demand Deposits (adj.)	Total	Time Deposits	Savings Deposits	Total		
1998													
Jan.	33,901.4	45,763.7	42,727.6	-4,646.2	83,845.1	11,141.5	16,532.6	27,674.1	16,022.6	50,498.1	66,520.7	23,551.7	
Feb.	35,536.0	45,589.7	42,741.7	-3,667.6	84,663.8	11,331.0	15,074.1	26,405.1	16,302.4	50,861.5	67,163.9	26,630.8	
Mar.	35,277.1	53,342.3	39,922.8	-6,618.4	86,646.7	10,620.3	15,170.3	25,790.6	16,912.0	50,254.6	67,166.6	28,966.6	
Apr.	35,663.1	68,694.3	36,418.1	-11,559.4	93,553.0	10,945.0	15,359.7	26,304.7	17,779.6	51,309.0	69,088.6	33,822.8	
May	35,148.7	67,209.7	35,954.6	-12,194.8	90,969.5	11,438.8	15,519.0	26,957.8	18,287.2	51,335.6	69,622.8	29,537.6	
June	37,373.4	67,165.7	34,956.9	-13,080.9	89,041.7	11,174.0	16,625.7	27,799.7	17,482.0	51,221.6	68,703.6	29,911.8	
July	37,563.4	64,758.6	35,276.4	-12,447.0	87,588.0	11,393.0	16,132.8	27,525.8	18,106.4	51,098.2	69,204.6	28,421.0	
Aug.	38,867.0	70,928.6	34,977.3	-12,916.3	92,989.6	11,285.5	16,880.7	28,166.2	19,285.8	51,285.9	70,571.7	33,118.7	
Sept.	38,661.3	72,410.6	35,668.3	-12,620.2	95,458.7	11,061.5	19,030.5	30,092.0	18,996.9	51,037.6	70,034.5	33,993.5	
Oct.	36,754.4	83,167.2	34,554.2	-12,748.9	104,972.5	11,440.1	17,975.3	29,415.4	19,457.4	51,747.7	71,205.1	41,106.4	
Nov.	37,284.6	79,834.2	35,162.8	-13,786.4	101,210.6	11,385.5	16,734.8	28,120.3	19,233.5	51,863.3	71,096.8	39,278.1	
Dec.	36,759.7	88,930.3	34,126.6	-13,683.1	109,373.8	13,494.7	16,682.3	30,177.0	19,599.9	52,754.4	72,354.3	43,602.2	
1999													
Jan.	36,921.9	87,026.0	34,561.1	-11,228.2	110,358.9	12,338.5	17,553.1	29,891.6	19,446.6	52,645.5	72,092.1	45,297.1	
Feb.	38,167.1	90,140.3	34,108.3	-11,282.6	112,966.0	12,476.9	17,621.9	30,098.8	19,649.1	53,041.0	72,690.1	48,344.2	
Mar.	40,202.4	83,223.4	33,268.8	-9,533.2	106,959.0	12,431.5	17,875.0	30,306.5	19,939.9	53,365.9	73,305.8	43,549.1	
Apr.	41,835.1	90,048.6	33,494.8	-10,294.9	113,248.5	12,847.1	18,488.1	31,335.2	19,672.2	55,072.3	74,744.5	49,003.9	
May	42,182.5	92,915.7	28,962.7	-2,203.1	119,675.3	12,496.3	21,316.0	33,812.3	21,092.5	55,387.1	76,479.6	51,565.9	
June	44,667.5	94,436.7	26,984.8	-2,462.4	116,959.1	12,593.1	19,444.1	32,037.2	20,385.1	55,511.9	75,897.0	53,692.4	
July	41,633.6	98,186.3	27,607.7	-4,036.6	121,757.4	13,168.9	20,054.4	33,223.3	22,507.3	56,033.2	78,540.5	51,627.2	
Aug.	42,661.0	101,668.4	27,633.4	-2,689.0	126,612.8	13,036.1	22,795.6	35,831.7	24,421.5	56,774.2	81,195.7	52,246.4	
Sept.+	42,907.7	99,035.2	27,331.6	-2,354.3	124,012.5	12,672.8	23,018.0	35,690.8	24,815.7	56,811.0	81,626.7	49,602.7	
Oct.+	42,210.1	101,095.1	28,446.5	-2,464.3	127,077.3	13,546.4	25,437.5	38,983.9	24,264.0	57,227.2	81,491.2	48,812.3	
Nov.+	40,885.1	103,568.7	28,035.7	-6,025.1	125,579.3	13,572.8	22,922.4	36,495.2	24,433.7	57,651.0	82,084.7	47,884.5	
Dec.*	40,028.5	106,703.3	26,696.5	-5,816.2	127,583.6	18,164.0	22,446.7	40,610.7	23,672.5	57,908.2	81,580.7	45,420.7	
2000													
Jan.*	43,029.8	109,610.4	26,260.1	-5,460.3	130,410.2	14,169.1	23,428.4	37,597.5	24,643.1	59,307.4	83,950.5	51,892.0	

1 / Assets and Liabilities include Local & Foreign Currency items.

+Revised

*Provisional

With respect to base money, this measure is published in *Table 5* of the *Digest*, which is entitled *Monetary Base Indicators*. The value for **M0**, which is presented in *column 5* entitled *Total*, represents currency issued by the BOJ and the combined liabilities of the

⁵ People's capacity to spend is a function of the availability of both local and foreign currencies. However, the central bank in pursuing its mandate of monetary stability seeks to preserve the value of the Jamaican dollar by managing the rate at which its total increases over time.

BOJ to commercial banks, namely statutory cash reserves and current account balances⁶ of commercial banks held at Bank of Jamaica. Although the table presents the statutory cash reserves of other financial institutions and building societies, they are not involved in the clearing process, and therefore *column 8* is not included in the measurement of BOJ's base money. (See Table 3 below)

Table 3

<u>BASE MONEY INDICATORS</u>							
J\$mn.							
<i>COMMERCIAL BANKS</i>				<i>STATUTORY CASH RESERVE</i>			
End of Period	Currency Issue	Statutory Cash Reserve	Current Account	Total	FIA Institutions	Building Societies	Total
1996							
Mar.	9,345	16,169	114	16,283	1,300	576	1,876
June	9,373	16,290	50	16,340	1,314	575	1,889
Sept.	9,421	16,308	167	16,475	1,239	662	1,901
Dec.	12,392	17,283	163	17,446	1,290	815	2,105
1997							
Mar.	11,116	18,170	233	18,403	1,278	905	2,183
June	10,984	19,842	157	19,999	1,116	985	2,101
Sept.	10,980	19,818	273	20,091	1,102	976	2,078
Dec.	14,242	19,921	1	19,922	1,077	961	2,038
1998							
Mar.	11,892	20,314	92	20,406	1,129	1,053	2,182
June	12,383	20,220	301	20,521	1,108	1,135	2,243
Sept.	12,275	20,167	99	20,266	1,122	1,372	2,494
Dec.	15,245	18,136	87	18,223	1,137	1,309	2,446
1999							
Jan.	13,473	18,530	71	18,601	1,132	1,381	2,513
Feb.	13,558	16,639	61	16,700	1,137	1,400	2,537
Mar.	13,925	16,938	153	17,091	1,093	1,413	2,506
Apr.	14,104	17,417	20	17,437	988	1,259	2,247
May	14,067	15,866	142	16,008	957	1,332	2,289
June	13,871	15,655	229	15,884	942	1,468	2,410
July	14,229	15,670	389	16,059	912	1,522	2,434
Aug.	14,484	15,920	178	16,098	528	1,384	1,912
Sept.	14,252	15,920	82	16,002	530	1,190	1,720
Oct.	14,913	15,376	50	15,426	498	1,019	1,517
Nov.	14,773	15,410	357	15,767	510	1,011	1,521
Dec.	20,870	15,452	75	15,527	518	436	954
2000							
Jan.	16,040	15,877	4	15,881	321	436	757
Feb.	15,307	15,508	370	15,878	304	435	739

The **BOJ** also considers more broadly defined monetary aggregates (including other financial assets) for internal policy purposes.

The Federal Reserve System (Fed)

Over the decade of the 1990s, there have been numerous revisions to the money supply definition employed by the Fed. The Fed employs three primary aggregates, namely, **M1**, **M2** and **M3**. **M1** comprises assets such as currency held by the public, demand deposits,

⁶ The current account of the commercial banks comprises excess reserves and transaction balances. Data reflect credit balances only.

travellers' cheques issued by non-bank financial institutions and other checkable deposits (OCDs)⁷. In defining its broader monetary aggregates, the Fed makes a distinction between short term and long term securities and also the size of these assets. For example, the **M2** aggregate comprises **M1** plus relatively small-denomination time deposits (under US\$100,000) including retail repurchase agreements (RPs), savings balances and money market mutual funds. In the case of RPs, they possess cheque-writing features, while mutual funds are similar to short-term time deposits because they can be easily converted to cash.

The **M3** aggregate includes **M2** along with relatively large time deposits, RPs (overnight and long-term over US\$100,000) – both issued by all deposit-taking institutions, Eurodollars (overnight and term) held by U.S. citizens in commercial banks worldwide and all institutional money funds. The least liquid measure, **L** represents **M3** plus Treasury securities, commercial paper, corporate bonds, consumer credit and bank loans. This latest aggregate is really a measure of the level of outstanding credit market debt of the federal and non-federal sectors.

The Bank of England (BOE)

The latest revision to the BOE's monetary statistics was conducted in 1998. The BOE employs two primary measures of money supply, namely base money (**M0**) and broad money (**M4**). The **M0** definition is consistent with the standard measurement of base money. The **M4** measure comprises all sterling notes and coins and sterling deposits held by the UK private sector other than monetary financial institutions (MFIs)⁸. Among these deposits are commercial paper, bonds, certificates of deposit, liabilities arising from repurchase agreements (repos) at British MFIs and sterling bank bills. In essence, all other non-MFI private sector sterling liquid assets, not captured in the **M0** definition, are accounted for in the **M4** measure.

⁷ ODCs consist of automatic transfer service accounts and negotiable order of withdrawals, credit union share accounts and current accounts at thrift institutions.

⁸ A new MFI sector was introduced in 1998 comprising the BOE, other banks and building societies.

As a member of the European Union (EU), the BOE employs a third monetary aggregate called **M3H**. This aggregate, which seeks to harmonise the definition of broad money used throughout the EU, comprises **M4** plus sterling and foreign currency deposits held by British public entities held in monetary financial institutions in Britain, along with private sector foreign currency deposits held in these institutions.

The Reserve Bank of New Zealand (RBNZ)

The RBNZ employs three primary measures of money supply, namely **M1**, **M2** and **M3**. The **M1** aggregate includes notes and coins held by the non-bank public plus private sector current account balances, all in New Zealand currency. The RBNZ does not include government balances held in the New Zealand banking system in any of its monetary aggregates. The components of **M2** are **M1** plus all other deposits that are available on demand, whether business, or private deposits. Examples of these deposits are savings deposits, overnight money and funding, which carry no break penalties. The broadest monetary aggregate, **M3** comprises **M2** plus all banks' term funding.¹⁰ There is an additional aggregate, **M3R** or **Resident M3**, which includes **M3** less New Zealand dollar funding sourced from non-residents.

⁹ A repo is an asset (security) that allows the holder to issue it to another party in exchange for cash, on condition that the security will be returned when cash is repaid at a premium.

¹⁰According to the June, 1999 issue of the RBNZ's Bulletin, term funding includes instruments called 'Bonus Bonds', that are issued by the Post Office Savings Bank. These bonds, which are similar to certificates issued by cash management trust do not bear interest, but participate in a monthly lottery that allocates the yield on the instrument as tax-free prizes.

This table provides a comparison of the monetary aggregates published by the four central banks mentioned above.

Table 4
Current monetary indicators of selected monetary authorities

	M0	M1	M2	M3	M3R	M3H	M4
BOJ	Currency plus reserves of the commercial banks held at the BOJ	M1/M1J comprises currency outside banks plus current account deposits of the private sector.	M2/M2J comprises M1/M1J plus time deposits and savings deposits of the private sector.	M2 plus commercial banks capital account, special debentures and provisions for loan losses.			
FED		Domestic notes and coins in the hands of the public plus current account deposits . OCDs and travelers cheques.	M1 plus Small-denominated repurchase agreements and time deposits. Savings balances and money market mutual funds.	M2 plus Large time deposits, large repurchase agreements and Eurodollars held by US citizens.			
BOE	Domestic notes and coin. Reserves					M4 plus sterling and foreign currency deposits held by British public entities in MFI's in Britain and private sector foreign currency deposits held in these MFI's.	Domestic notes and coins, certificates of deposit, commercial paper, bonds, repurchase agreements and Bank bills.
RBNZ		Domestic notes and coins and current account deposits.	M1 plus all other private deposits available on demand, less inter-institutional and government balances.	M2 plus all other banks' term funding minus Government deposits.	M3 less New Zealand dollar funding sourced from non-residents.		

4. Summary

The behaviour of monetary aggregates is critical to the maintenance of economic stability. Whereas an expansion in the money supply facilitates economic growth, excessive increases in the rate of growth of money supply have an adverse effect on the price level and the level of income in an economy. This calls for close monitoring of the movement in money supply by the monetary authorities. In order for central banks to control the money supply, they have to firstly, determine its components and then measure these monetary aggregates at regular intervals. Economists have proposed a functional definition of money, i.e. any object that is generally acceptable in facilitating the exchange of goods and services. The emphasis here is on liquidity or the ease with which an asset can be used for payment or converted into an accepted form for payment.

Central bankers around the world have employed measures that are unique to their institutions and designed to provide more relevant estimates for their country's circumstances. Despite variations in the measurement of money supply, it is important that consistency be maintained. Countries with fairly developed financial and money markets tend to include a broader range of less liquid securities in their calculations, while others confine their measurement to a more narrow range of highly liquid assets. This underscores the point that only items that are deemed to have a relatively strong actual or potential impact on people's spending should be included in a country's money supply measurement.

Appendix

BOJ's money supply indicators as at July 1999

Measure	Millions of J\$
Base money =	
<i>Currency Issue</i>	13871.1
<i>Commercial Banks</i>	15884.5
Statutory Cash Reserves	15655.4
Current Account	<u>229.1</u>
Total = M0	<u>45640.1</u>
Local and Foreign Currency	
M1=	
Currency with the public	12834.2
Demand Deposits	<u>18717.4</u>
Total = M1	31551.6
M2=	
M1 plus	
<i>Quasi Money</i>	74573.7
Time deposits	19628.2
Savings deposits	<u>54945.5</u>
Total = M2	<u>106125.3</u>
Local Currency	
M1J=	
Currency with the public	12834.2
Demand Deposits	<u>16043.6</u>
Total = M1J	28877.8
M2J=	
M1 plus	
<i>Quasi Money</i>	54416.5
Time deposits	13877.6
Savings deposits	<u>40539.0</u>
Total = M2J	<u>83294.3</u>

Source: Bank of Jamaica, "Economic Statistics", July 1999

Glossary of Terms

Banking System: The banking system consist of commercial banks *only* as these are the only institutions involved in the clearing process.

Current Account: A bank deposit that can be withdrawn at anytime without notice. This is the most common type of bank account, on which deposits do not usually earn interest.

Fiat Money: Legal tender which has value only because the issuing authority declares that it is money and the public at large accepts it as such.

Financial Assets: A financial asset is something issued by an institutional unit, (e.g. BOJ) that provides economic benefits, by (1) generating interest income or net profits and (2) acting as a store of value. These benefits are created through a formal/informal borrowing/lending relationship. Most common types of financial assets are money and credit.

Liquid Asset: An asset is considered liquid if it can be easily and with little or no loss converted to cash. The liquid assets of commercial banks in Jamaica include notes and coins, short-term deposits at the Bank of Jamaica and any designated GOJ security, usually maturing within 270 days.

Liquidity: The ease with which an asset can be exchanged for money.

Money: Anything that is generally accepted in exchange for goods and services. (e.g. notes and coins). Hence money is said to be a medium of exchange. Money is also used as a measure of, as well as a means of storing wealth.

Money Supply: This is the stock of instruments or assets formally designated as money in a particular economy. There are alternative measures of money supply both within and between countries. In Jamaica, the measurements of money that are calculated and published are:

M1: Notes and coins in circulation + Demand Deposits

M2: M1 + Time and savings deposits

Mutual Funds: Financial institutions which acquire funds by selling shares to many individuals and use the proceeds to purchase diversified portfolios of stocks and bonds. The pooling of funds therefore reduces the transactions costs involved in the purchase of large blocks of stocks and bonds.

Quasi-Money: Also referred to as near money. This is an asset which is transferable and which therefore can be used in the exchange of goods and services, but has not achieved the monetary status of banknotes, coins and cheques.

Repurchase Agreement (repo): The purchase of a security from a primary dealer who agrees to buy back same at a specified rate and an agreed future date.

Securities: Legal documents giving title to property, or claim on income, for example, bonds and stocks.

Statutory Cash Reserves: That portion of deposit liabilities of deposit-taking institutions which by a statutorily based stipulation, must be held as interest free deposits at the Central Bank.

Time deposit: A bank account based on a contractual arrangement between the deposit taking institution and the depositor where both parties agree to a pre-determined interest rate and maturity date, on which deposits earn interest and premature withdrawals from which require advance notice.

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